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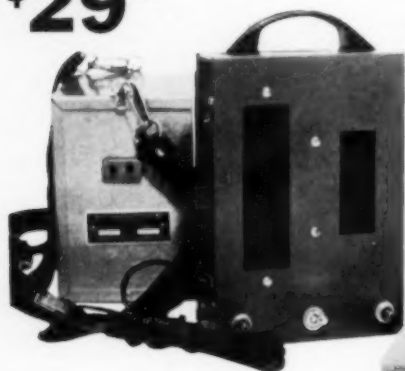


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Volume 13
No. 3
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Official Publication of the Midwest Federation of Mineralogical Societies.

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OUR FIELD TRIP WONDERLAND

Cover Photo by Homberg: This air-view of Ishpeming, Michigan, host city of the 1960 Midwest Federation Field Trip Convention, gives one an excellent opportunity to study the terrain and nature of the country which is to be visited by more than 1000 rockhounds next July 1st to 4th. Daily scheduled field trips will radiate out from here over the Iron Range, where all will have a chance to collect fine mineral specimens to their heart's content. Note mine dumps in the foreground which will be typical of the many to be visited on these trips.

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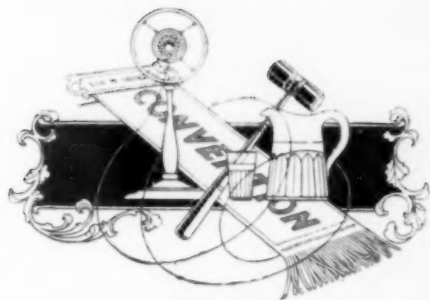
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Editor's Memo Pad

CONVENTION Time is Here!! This is the time of the year for which so many of us have been looking—for seemingly a long time. The Convention season is now upon us.

Before our next issue is off the press, many important conventions will be a matter of history, all will be outstanding, and we would like to encourage as many of our readers as possible to attend at least one of these fine meets. You will never regret or forget it.

One matter that we would especially like to emphasize, to the many of our subscribers who reside in so-called "out of the way places," perhaps remote from any form of Earth Science club activities, is that one need not be a member of any Federation or other society, to be privileged to attend any of these conventions, either local, Regional or National. Wherever you may go you will always find the "glad hand" and the welcome mat will be out for you.

All you will need to do is to walk up to the registration desk and announce your presence, and for a small admittance fee you may receive a single admission ticket, or should you desire, a card which will admit you to all of the activities of the entire show. The banquet and other social events are always of special interest.

At the show you will find a great many worthwhile things to look at, both useful and ornamental. On the useful side there will most likely be many exhibits of all kinds of lapidary equipment, some of which no doubt will be in operation, and here one may see and learn for himself the proper tools, methods and procedures necessary for producing specimens of high quality, being illustrated by expert and skilled workmen. Regardless of how proficient one may be in his own right, there are always new ideas and means of

accomplishing the same thing by easier or better methods.

Then there will also be dealer exhibits where one may examine and purchase, if he wishes, just what he may perhaps have been looking for, or wanting for a long time, but did not know where to find it. Here as they say, you can "make up your mind"; and it will cost you nothing to look. There will also be a wide selection of books⁴ and other literature (magazines) for you to examine.

There will also be many personal and club exhibits, some of them seemingly "out of this world." Among them you will find cases of fine mineral specimens, crystals, polished agates and other semiprecious stones, and even fossils, Indian artifacts and other types of collections that you have never before seen or even dreamed of. Regardless of how many convention shows that one may attend, it always seems that each new one with all of its breath-taking exhibits is just a little better than the ones which preceded.

Where are these shows to be, you may ask. To list all of the good local club shows that are held every year would be almost like a list of the clubs themselves. This of course would be impossible. In the Midwest territory alone there will be several authorized sub-regional "Rock-ramas" which will be almost as good as the regional convention itself. Watch your calendar listings for these. In another column you will find the dates and location of the big Regional Shows—so shoot for the one which seems most convenient for you.

The Midwest Field Trip Convention being held this year at Ishpeming, Michigan, July 1st to 4th, will perhaps be the greatest opportunity ever afforded mid-westerners for a grand opportunity to geologize and collect fine mineral specimens, for here some of the finest in the

entire country are available for the finding.* The Ishpeming folks have gone all out to make this a grand affair and organized parties are coming from as far away as Connecticut. We would advise that you make your reservations early, for if you miss out on this trip you will be missing the chance of a lifetime to have a very wonderful time.

Another big show will be the American Federation Convention being entertained by the California Federation July 8th to 10th, at Redwood Acres, Eureka, California, the Humboldt Gem and Mineral Society serving as local hosts. This will be the 1960 National Gem and Mineral Show.

*Do not fail to read "Bob" Markert's highly informative article in this issue on what you may expect to find up in the Iron & Copper Country of Minnesota.

* * *

For the **Ishpeming Field Trip Convention** we recommend a new map of the bed rock geology of the Iron River-Crystal Falls district of Michigan, prepared in cooperation with the Geological Survey Division of the Michigan Department of Conservation, just published as Mineral Field Studies Map MF 225, U.S. Department of Interior. Copies can be purchased for \$1.00 each from the Geological Survey, Washington 25, D. C.

The map, in two sheets and accompanied by a stratigraphic chart, is an interim report pending ultimate publication of a comprehensive report on the district as a Geological Survey Professional Paper.

The district, about 300 square miles in area, is one of the oldest iron-ore producers in the Lake Superior region. Mining began in 1882, and since that time approximately 160 millions tons of ore, valued at about a billion dollars, has been shipped. Nearly all of the ore has been produced from underground mines. The ore occurs in beds of Precambrian iron-formation more than 1500 million years old.

* * *

A Good Rock Sack is a paper boy's bag. You can carry the weight on your shoulders.

* * *

Some drill and bore the solid earth, and from the strata there extract a register, by which we learn that he who made it and revealed its date to Moses, was mistaken in its age.

—Cowper

Important Regional Conventions and Shows:

JUNE 17-19—Rocky Mountain Federation Convention and Show, Civic Auditorium, Albuquerque, New Mexico.

July 1-4—Midwest Field Trip Convention. Headquarters: Ishpeming, Michigan. Daily escorted Field Trips into the iron and copper country for collecting.

July 8-10—California Federation hosts to the American Federation of Mineralogical Societies, National Gem and Mineral Show, Eureka, California. Humboldt Gem and Mineral Society, local hosts.

August 4-6—Eastern Federation Convention and Show. Municipal Auditorium, Asheville, North Carolina. Field trips schedules for August 7-13, conducted by local host Society.

September 3-5—Northwest Federation, Lane County Fair Grounds, Eugene, Oregon. Held annually on the Labor Day weekend holiday.

September 23-25—Midwest Sub-regional Rockrama, Decatur, Illinois. Central Illinois Rockhounds host. (See special announcement in this issue of Earth Science).

Other Dates for Your Calendar

The Lincoln Orbit Earth Science' of Springfield, Ill. and the Siloam Springs Earth Science Club of Mt. Sterling, Ill. will hold a gem and rock exhibit at the Sangamon County Junior Fairgrounds on May 21-22. There will be no admission charge.

The tenth annual Gem and Jewelry Show of the Chicago Lapidary Club will be held May 20-22 at the Marquette Park Field House, 67th and Kedzie Ave., Chicago, Ill. All Chicago area clubs are invited to participate in this show. It is competitive and many trophies will be awarded. Admission is free.

On June 23-24, the Gem City Rock and Mineral Association of Erie, Pa. will hold mineral, rock and lapidary show at Knox Hall, 250 West 7th St., Erie, Pa. Any dealer, club or club member wishing to display, can get full information by writing Miss Miriam Kuhns, 336 East 21st St., Erie, Pa. Admission will be 50c for adults and 25c for children.

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Your Reservations . . .

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MICHIGAN—the "Salt of the Earth"

Few people realize the great importance of salt, halite to the mineralogists. Aside from its many interesting forms and properties, its utility in nature is indispensable. Without it higher forms of life upon the earth could not exist and many circumstances would be far different than they are today.

Wars have been fought over it, men have been enslaved for it, and in earlier civilizations salt was an important article of barter, and even today it is highly essential to our economic well-being. Wages were once paid the worker in pittance of salt, and many of us now draw our salaries, a word derived from the term *salt* itself.

Fortunately the world supply of salt is as inexhaustible as the oceans themselves, likewise in the strata of the earth's rock structure, and this is indeed a comforting thought. It has been recently estimated that beneath the surface of the great state of Michigan itself there lies a salt reserve of more than 71 trillion tons—some salt isn't it? (How much is a trillion—you figure it!)

A Rockhound's Pocket Piece

Walter Burdette, of Nyssa, Oregon, writes that when he was a boy in Kansas, his principal interest in rocks was something to throw at the birds. Later he found rocks to be interesting and began looking for odd shapes and patterns, and among them he found many interesting pieces.

On one he found an excellent image of a rabbit which he carried as a pocket piece for many years, and who hasn't carried a beautiful agate, a crystal, or perhaps an arrow-head or some colorful mineral specimen as a treasured item, largely of sentimental value only.

It is from these insignificant objects that many boy scouts, and even grown-up people first become interested in minerals, thus forming the nucleus from which many of our finest collections have grown. Mr. Burdette himself now owns one of these fine collections in which he takes great interest, and which he proudly exhibits to his friends and callers.

What is your pocket piece or "good-luck" stone like? Chances are that you have one, and he would like to hear from you.

Our Authors

Arthur Earl is physically the bigger half of "The Victors" of Spokane, Washington, who are well known in the western states for the service they perform in providing materials and information to rock tumblers and polishers. Lila Mae is the diminutive dynamo who powers the other end of the tandem. Their rock business began during World War II when their home was always open to service men. The boys usually carried away a souvenir specimen of some kind and after the war began to send back for more. We don't know anyone better qualified to advise on "So You Want to Start a Rock Shop." Our article is a brief resume of the Victors' new book of the same title.

W. L. Gelston, who shares with us his know-how on polishing Petoskey stones, is Superintendent of Schools in Cadillac, Michigan, which is about 50 miles from the lake shores on which these fossilized corals are found. Bill (M.A. in Administration, University of Michigan) has served on the Conservation-Education Committee of his state and with his wife, son, and two daughters is active in Cadillac's rockhound club. He would be glad to exchange ideas with any readers of his article or swap a Petoskey for another interesting fossil or mineral. Just "Cadillac, Michigan" will reach him.

OUR associate editor, Richard M. Pearl, of Colorado College (Colorado Springs), has contributed many splendid articles to our pages in the past. In his current article he gives us a vivid account of how it feels when one experiences a genuine Earthquake. He was there, believe it or not.

Donnafred Hoff, our Art Lapidary editor, is widely known both as an artist and a writer. She contributes regularly to the Chicago Tribune's famous Line-O-Type column and has published a book of poems.

Robert Markert is now president of the Midwest Federation, and under his competent guidance the Federation is making great strides at an ever augmented pace. He will greet and welcome you at the Ishpeming Field Trip Convention in July.

Midwest Club News

Mrs. Bernice Rexin, Club Editor
3934 N. Sherman Blvd.
Milwaukee, Wisconsin

KALAMAZOO GEOLOGICAL AND MINERAL SOCIETY recently viewed colored slides of New Mexico and Colorado, which were prepared and shown by Rev. Luke McMillian. Beautiful scenes were shown of the Carlsbad Caverns; the world's largest surface deposit of gypsum—the White Sands Monument in New Mexico; and Colorado's Garden of the Gods. Rev. McMillian gave an interesting commentary on the geologic features of each area as it was shown on the screen.

LAKE ERIE GEM AND GEOLOGICAL SOCIETY planned to meet in Brandeui's Jewelry Store, Elyria, Ohio, during March to hear Tom Haywood, a registered gemologist, speak on "Gem Stones."

MICHIGAN LAPIDARY SOCIETY'S guest speaker at its February meeting was Donald Parser of the A. G. Parser Co., New York importers of rare minerals. Mr. Parser showed slides of his recent collecting trips through Brazil, India and Russia. He pointed out that the only gem stones mined in Russia are emeralds and these are of a poor quality. There is no gem cutting in Russia.

TRI-STATE GEM AND MINERAL SOCIETY (Dubuque, Iowa) held its first silent auction during February. On the tables there was pyrrhotite from the famed Sudbury area in Canada; thomsonite from Grand Marais, Minn.; chalcedony roses from the Southwest; crazy lace from Mexico; and many other minerals. Oddly, only one agate was offered and that was in a pendant.

ST. LOUIS GEM AND MINERAL SOCIETY urges all rockhounds to observe this rule: Do not handle a mineral specimen without the owner's permission. Recently Frank Leans, a member of the society, had some green millerite on display and someone rubbed a finger over it and completely ruined the specimen.

NEBRASKA MINERAL AND GEM CLUB is installing a lapidary shop in the basement of the Luther Memorial Lutheran Church, where it holds its regular meetings. The equipment will be used primarily for teaching lapidary.

The club passes on this interesting information. Diamonds are being mined by Russia from Kimberlite veins or tubes in Northwestern Yakutia, Siberia, only 56 miles from Alaska.

DES PLAINES VALLEY GEOLOGICAL SOCIETY recently heard Rev. Erwin Wendt give an interesting talk on "Gem Stones of the Bible." Rev. Wendt not only discussed the various gemstones mentioned in the Bible, but also told what archaeologists have learned about the gems that were known to the biblical people. He pointed out that nearly all of the 12 stones on the breastplate of the high priest of Israel are included in our list of modern birthstones.

ELKHART MINERAL SOCIETY'S February meeting was devoted to paleontology. A panel of members presented an informal talk on "Midwest Fossils," and then showed slides depicting fossils as they appeared when living in past ages (dioramas). The program was concluded with a short demonstration on how to cut and polish petoskey stone, a Devonian age fossil with an attractive geometric pattern.

TRI-COUNTY ROCKS AND MINERALS SOCIETY is trying to locate new sources of gem material in the lower peninsula of Michigan. It is offering a trophy to its member who locates the best polishing material in the lower part of Michigan before September 1960. To be eligible, the material must be in sufficient quantity to be collected (not just a chance piece) and must take a polish high enough to reflect a clear image of an incandescent bulb. Petoskey stones and chert are ruled out.

GRAND RAPIDS MINERAL SOCIETY at its March meeting heard the "Petoskey Stone Man," Jerry Morris, give a talk on cutting and polishing petoskey stone with simple equipment. Mr. Morris has made his share of petoskey stone buttons, pendants, and earrings, but what interests him most is freeing the design that he sees in a petoskey stone. One petoskey stone suggested to him "man's emergence from darkness" and from it he carved a very fine Neanderthal type head. In his bin he has a stone which he thinks will become a buffalo, another that he sees as a lizard. He plans to carve a totem pole, in six sections, when he finds the right petoskey stones for the project.

DES MOINES LAPIDARY SOCIETY recently featured a demonstration lecture on flower arrangements by Mrs. Tomako Yamamoto, Master of Flower Arrangement. When Mrs. Yamamoto received this title in Japan 50 years ago, she was the youngest person and the first woman to be given the title. She related her flower arrangements to the society's hobby, explaining that flowers and rocks are both derived from the earth and that very pleasing and artistic effects can be obtained by placing them together.

CENTRAL MICHIGAN LAPIDARY AND MINERAL SOCIETY'S guest speaker on March 17 was Miss Helen Martin, formerly of the Michigan Geological Survey, who chose as her topic, "The Ice Age in Michigan, What has Happened in the Last Million Years."

On March 20th the society made a guided tour of the Cranbrook Institute of Science at Bloomfield Hills, Mich., which has a collection of nearly 10,000 mineral specimens and 2000 fossils.

JUNIOR ROCKS AND MINERALS SOCIETY is the newest junior society to be formed in the Midwest, and is affiliated with the Central Michigan Lapidary and Mineral Society. It has an excellent publication called the "Pebble Pup Journal" that makes good reading for adults as well as juniors. In each issue, a collecting area in Michigan will be featured; the first such area to be described in the bulletin is Bellevue, Mich., where marcasite, pyrite, calcite and limestone are found in the local quarries.

MINNESOTA MINERAL SOCIETY reports that George Rickert, a member of the club, is preparing fossil sets, containing 50 specimens each, and presenting them to junior and senior high schools in Minneapolis, Anoka, Osseo, and Robbinsdale, Minn. Mr. Rickert is a frequent lecturer on paleontology at these schools.

CENTRAL IOWA MINERAL SOCIETY on March 4 heard Dr. George Switzer, Curator of the Department of Mineralogy and Petrology of the Smithsonian Institute in Washington, D.C., speak on "The Smithsonian Institute." Roughly half a million dollars was bequeathed to the United States of America, by James Smithson who died in 1829, for the founding of an establishment for the increase and diffusion of knowledge among men. No one knows why he named the United States of America as his legatee; he had lived extensively in France, Germany and Italy, but had never visited this country. It may be that Smithson was inspired by George Washington's Farewell Address to the people some years before, in which he said: "Promote then as an object of primary importance, institutions for the general diffusion of knowledge."

The original Smithsonian Building was completed in 1855, but as the collection grew, it was necessary to add new buildings and today the Institute is housed in five great buildings. Its mineral collection alone totals about 75,000 specimens and grows at the rate of several thousand specimens a year. Less than 3% of this collection is on public display.

WISCONSIN GEOLOGICAL SOCIETY on March 14 heard Robert R. Markert, President of the Midwest Federation, present an illustrated talk on "Collecting in Upper Michigan." Slides shown by Mr. Markert included minerals found in the area, collecting sites, and beautiful views of the country's interesting geological formations. Mr. Markert brought many samples of minerals found in the area to the meeting and presented everyone present with a slab of kona dolomite, a new cutting material, with a delicate scenic design, found near Ishpeming, Mich. This material is plentiful and everyone attending the Midwest Convention in Ishpeming will have an opportunity to collect some of it.

This talk was also presented by Mr. Markert to the Earth Science Club of Northern Illinois, and the Chicago Rocks and Minerals Society during February.

INDIANA GEOLOGY AND GEM SOCIETY featured a two-part program at its February meeting. Ralph E. Hagemier presented an excellent talk on "Preparing your Collection for Display," and Miss Lavon Whitmire displayed textile designs inspired by rocks and crystals. The designs were the creations of Miss Whitmire's art class of high school sophomores. She related that her students had to be convinced that the rocks and minerals she brought into the classroom were natural formations. They were fascinated when given a brief explanation of the crystal system.

EVANSVILLE LAPIDARY SOCIETY cut and polished opals by hand at its February meeting. Free form was the shape selected by most of the opal cutters. The fiery gem material used for the project was donated to the group by Dr. Glen Black.

The society is preparing a permanent gem display for Evansville's new museum.

FLINT ROCK AND GEM CLUB enjoyed two interesting talks at its February meeting. Fred Ham spoke on "The Origin and Development of Caves," and Dr. Benjamin Moulton discussed his trip to Northeastern United States last summer.

WABASH VALLEY GEM AND MINERAL SOCIETY'S three-day exhibit of gems and minerals, during February, in the Purdue Union building was a great success. Because of the many visitors, the display room was kept open, each night, long after the announced closing hours. One case containing a placard, "Sorry, our minerals are snowbound," told the story of the only weak spot in the show.

(Continued on Page 112)

ATTENTION, ROCKHOUNDS

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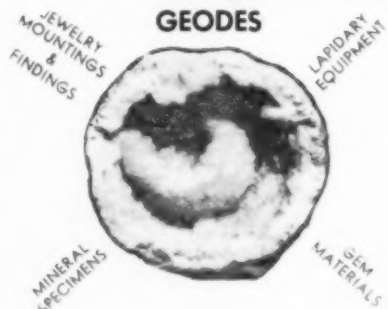
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Vol. 13.

No. 3.

June, 1960

Jewelry Design, A Creative Art

By DONNAFRED HOFF

IN this article we will be concerned only with design. The author will leave to the lapidarist the processes of cutting, shaping and polishing the stone, and to the jeweler the many intricate and involved procedures (sawing, piercing, filing, hammering, burnishing, etc.) which are required to execute a finished piece of jewelry. For the details of these procedures we refer you to two excellent books which are most thorough and helpful in their explanations and which have exceptionally lucid illustrations: "Jewelry Making for the Beginning Craftsman" by Greta Pack, published by the Van Nostrand Co. Inc., Princeton, New Jersey, and "How to Make Modern Jewelry" by the Museum of Modern Art, N.Y., published by Simon and Schuster.

We know that the lapidarist and the jeweler may each be an artist in his own right but, for our purposes, only the designer will be referred to as the artist.

To develop the design sense will be our first objective. Nature created the stone. It is up to the artist to see the possibilities in the stone and develop them to their fullest potential. We will start with a series of definitions: DESIGN IS THE ORGANIZATION OF ALL THE ELEMENTS OF ONE'S MATERIAL, COLOR, LINE, FORM, MASS, AND TEXTURE (which we call the tangibles) INTO A HARMONIOUS WHOLE WITH THE HELP OF BALANCE, RHYTHM, CONTRAST, REPETITION, SEQUENCE, AND SCALE (which we label the intangibles).

1. COLOR. One can speak of color

more intelligibly by referring to the color wheel. See illustration 1. The six spectrum colors together with their blends form this color wheel. The four most commonly used color harmonies are:

A. Analogous, related colors, three colors closest to each other on the color wheel. Illustration 1-a.

B. Complementary, contrasting colors, opposites on the color wheel. Illustration. 1-b.

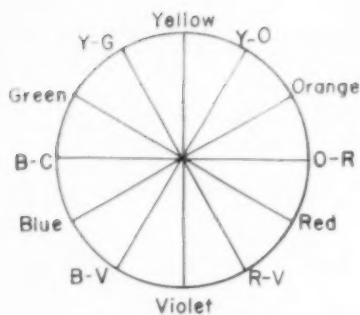
C. The triad, any three colors equidistant on the wheel, as red, blue and yellow; yellow-green, red-orange and blue-violet. See illustration 1-c.

D. Monochromatic, several shades of one color, as red to pink or pale green to dark green.

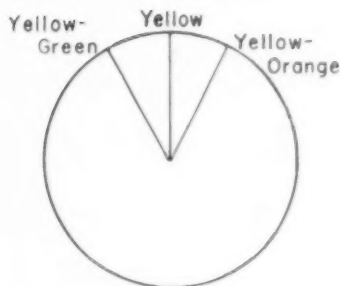
2. LINE. A line is the directional path that each object of a design traces through space. It can be a visual path that the observer feels, though the line may not actually be there. For example, if you draw a curved line, or half circle, the eye will tend to complete the circle and proceed from one line over a gap to the next line, *if* the directional force is there. Illustration 2-a. The eye also follows converging lines, so be certain that you take advantage of this quality and let your center of interest be at that point of convergence. A line can lead the eye wherever the artist chooses it to go.

3. FORM is the external shape or structure of your material.

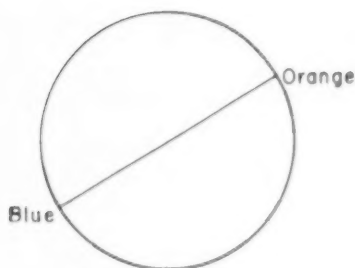
4. MASS refers to size or weight. Weight is not merely a matter of ounces for a dark or opaque stone implies more weight than a transparent or pale colored stone of equal size.



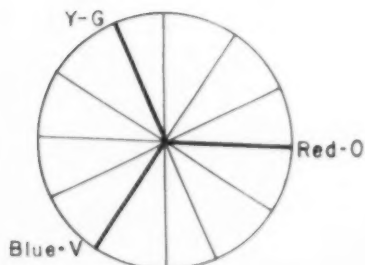
I. Color Wheel



Ia. Analogous



Ib. Complementary



Ic. Triad

5. TEXTURE is the actual structure of the surface of your material: smooth, grainy, ribbed, pebbled, satin, velvet, pitted, etc., or the simulated or visual texture, which may feel perfectly smooth to the touch while having the look of texture. In jewelry the visual texture is most often used. See illustrations 2-a and 5b.

A work of art is created by applying the intangible principles of design which follow, to the tangible elements of one's material. Or, to state it another way: one takes the materials at hand and combines them in significant relationships into a visual harmony.

The principles: Illustrations 3a to d.

I. Balance, the equal or pleasing distribution of weight or importance.

a. Axial balance: a large weight close to axis will balance smaller weight a greater distance from center.

b. Symmetrical balance: both sides identical with respect to a center line.

c. Asymmetrical balance: sides of equal weight but differing in size and/or shape.

d. Occult balance: an indefinable but felt balance.

II. Rhythm, a pattern of motion, usually achieved by the recurrence of line, repetition of texture, sequence of color, size or shape. A proper relation and interdependence of parts. See illustration 4.

III. Contrast, opposition of different forms, lines, colors or textures to intensify each other's properties and produce a more dynamic expression. Illustrations 5a. and 5b.

IV. Repetition, duplication or recurrence. Illustration 6. Repetition makes for monotony.

V. Sequence, a pattern, line, color, etc., repeated three or more times in growing or diminishing size, intensity, or changing direction. Illustration 7. Sequence is repetition with variation: However, repetition with variation is not always sequence. See illustration 4.

VI. Scale, a comparative relationship between dimensions, weights or quantities. Proportion. Illustrations 8a., b, and c. A massive stone requires a heavier setting than a thin



2a. The Eye Completes the Curve



4. Rhythm Achieved by Repetition of Line



7. Sequence of Size



3a. Axial Balance



5a. Contrast of Shape



8a. Scale out of Proportion



3b. Symmetrical Balance



5b. Contrast of Texture



8b. Scale out of Proportion



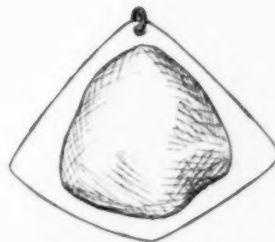
3c. Asymmetrical Balance



6. Repetition of Shape and Texture



3d. Occult Balance



8c. Correct Scale

or transparent one. Let the stone be scaled to the setting and to the purpose for which it is intended. A piece of jewelry should not overwhelm the wearer or vice versa.

So much for definitions. I have omitted several, but have tried to include all the ones most applicable to jewelry design.

A good way to familiarize yourself with the essential meanings of the design elements and principles is by listing them so:

Balance	Color
Rhythm	Line
Contrast	Form
Repetition	Mass
Sequence	Texture

Scale

and doing sketches to illustrate each of the principles I to V applied to each of the elements in turn, as balance of color, rhythm of color, contrast of color, or balance of line, rhythm of line, etc., down through the series.

When all this is firmly in mind, select a stone that pleases you in size, shape, color and texture; take a large white sheet of paper, an area to tempt you to expand your ideas, and try many designs to see which best brings out the essential qualities of the stone. You may also reverse this process and start with your jewelry idea, selecting a stone to fit. I prefer the first method. A creative-minded, design-conscious artist can create a harmonious piece out of whatever materials are available. There is a kind of inevitable logic to design: this line calls for an opposing line; this color cried for a similar or a contrasting color to enhance it; this weight requires a counterbalance, "etcetera, etcetera, etcetera." Let the design be your very own. "Imitation is the expression of a poverty-stricken self."

Experiment is a stimulating process. It may be called "exercising the muscles of the mind." We all have creative capacities so don't let yourself be discouraged. Regardless of imperfections of technique and/or a feeling of inadequacy in your knowledge of design, plunge in and make your jewelry in your own peculiar, personal, different

way. Genuine self-expression has deep value and you will find your *self* growing along with your creative projects.

In our next article we will take actual pieces of jewelry (or stabiles or mobiles) and critically analyze them, with the help of our stated principles of design, to find whether they are good or bad and what makes them so.

NOTED ARTIST CONTRIBUTES NEW EARTH SCIENCE COVER

WITHOUT doubt all of our readers have been attracted by the "eye-catching" design of our new front cover page, and well they might be, for it was prepared and drawn by Ben A. Benson, of Downers Grove, Illinois, a free lance artist who has maintained a studio at 739 N. Michigan Avenue, in Chicago, for the past 30 years.

Prior to 1930, he taught art in the University of Nebraska for 5 years. Not only a commercial artist of note, he has exhibited water colors and wood engravings in the New York Public Library and elsewhere across the continent throughout the Midwest and on out to the Pacific coast; at the Joslyn Memorial Art Center in Omaha, Nebraska, and in the Corcoran Art Gallery in Washington, D.C. He has received honorable mention in etching in National Poster contests.

He is deeply interested in Boy Scouting, and in the Earth Sciences and Astronomy, upon which subject he frequently lectures publicly. W.H.A.

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TIFFANY VS. WOOLWORTH

You can now have your pearls X-rayed to determine whether they are natural or cultured. Natural pearls are like onions in that they are made up of concentric rings.

Cultured pearls are merely pearl coatings over a fragment of mother-of-pearl inserted in the tummy of an oyster, yet they so resemble natural pearls that experts are often deceived.

Because the internal structure of each natural pearl is slightly different from that of any other, radiographs can be used for positive identification.

(From the Oregon Rockhound, and the typewriter of Lillian Mihelcic.)

Petoskey Stones

By WILLIAM L. GELSTON

MICHIGAN is famed for its many beautiful minerals but my favorite is the Petoskey stone. This fossil (Colony Coral, *Hexagonaria percarinata* Sloss) originated in the warm salt waters that covered Michigan during the Devonian Age some three hundred or more million years ago.

Petoskeys are found in abundance along the northern shores of Michigan's Lower Peninsula and around some inland lakes. My father built one of the first summer cottages on Crystal Lake, which is only a mile or so inland from Lake Michigan. As a child Petoskeys interested me only as good "skippers" or stones for the goldfish bowl. Two years ago I found an almost perfectly round Petoskey with such distinct pattern lines that I decided to polish it.

One gratifying result of my new interest in the stone has been the discovery that many other people, in this and other countries, admire Petoskeys

also. Between July and September of 1959 I shipped over a ton of these stones to seven foreign countries and to many western states. This has meant many miles of hiking along beaches, wading, and even skin diving to collect the better stones.

After I made up my mind to polish my first good find, I sought the advice of a friend who had been successful in polishing other types of minerals. He warned me that Petoskeys were very hard to polish. This merely presented a challenge and I proceeded to buy quantities of wet-strength sandpaper and set to work polishing that stone by hand. I sanded 14 hours before I was satisfied. Needless to say, this stone has a place in my display cabinet to this day.

Being lazy by nature, yet wanting more polished Petoskeys, I at once started to beg, borrow, and almost steal all available literature on these stones. I tried to put into practice all the ideas that were offered. I sincerely believe no man has experimented more with one rock than I have with the Petoskey, and I still am willing to try any suggested method to improve what I now believe to be the perfect method of polishing.

I would like to mention right here that I consider John Willhammer of Gary, Indiana, to be the Dean of Petoskey Polishers. He has helped me greatly. Many readers of this article may also have seen his "Polishing with Velvet" in the December 1959 issue of *The Lapidary Journal*.

The difficulty in obtaining a good polish on Petoskeys is primarily due to the relative softness of the limestone of which it is composed (3½-4 on Moh's scale of hardness). Another drawback is its sensitivity to heat. The whitish eyes that frequently appear in the stone and detract from its beauty are caused by fracture of the quartz-like eyes, either from bumping



The author at his polishing wheels. Final phase in preparation of a polished Petoskey stone.



Lavalier and earrings. Note radial lines emanating from circular eyes of individual polyps.

of the stone before it was picked up, or from heat generated during sawing, grinding (particularly if the stone is out of round), or sanding. I proved to myself once that heat alone causes fracture when I accidentally dropped a polished Petoskey in a batch of boiling fudge. I retrieved the stone at once, without telling my wife. All the eyes had "popped."

Let's consider each step individually in the process of obtaining a finely polished Petoskey. First and foremost, one desires clear and distinctive lines. A Petoskey, like a Thunderegg, cannot be predicted as to its interior. As a matter of fact, many lapidary experts do not attempt to slab a Petoskey but rather find a stone with a good surface and merely remove that portion from the stone to make a cabochon.

After finding a desirable Petoskey that appears to have no holes or discolorations (which denote leaching and create pinholes that will never give a glossy finish), one normally cuts across the grain showing the eyes. For cutting I use an 8" trim saw which is running deeper than usual in oil to avoid heat. Do not hurry your cut; let

the saw do the work. Any pressure will create heat and result in "whitish eyes" that will detract from the beauty of the finished piece. Incidentally, it has been my experience that as a rule the darker the stone, the harder it will usually be and the easier it will polish.

Following the roughing-out of the desired pattern on the trim saw, I do my grinding on a 100 grit, silicon carbide, 1" grinder. Many use 200 grit. However, I have never felt this necessary, probably because at the beginning I didn't have any. I run my wheel in water at a speed of approximately 2600 RPM for this work, never hurrying or applying too much pressure in order to avoid heat.

After shaping on the grinder I sand each piece by hand. I prefer this, as paper will fit the shape of the stone easier than a wheel. I begin with a 220 grit wet sandpaper, then frequently jump to a 400 grit paper. However, this depends on the surface and one develops a touch to determine if the 320 grit paper should be used in between. Sanding takes me from 10 to 15 minutes for a lavalier, and slightly

more for a pair of earrings or cuff links where two pieces are involved and I want to maintain a good, clearly-defined edge or bevel. For those who prefer to use a wheel I recommend an 8" wheel and suggest again wet sandpaper and the same grit in the order used in hand sanding. I prefer the disc type sander operating on the end of the shaft. Run this considerably slower than the grinder (650-800 RPM) using a 1½" pulley on the motor and a 3 or 4" pulley on the arbor. Touch lightly to the paper and above all use fresh paper always. Worn paper merely creates heat by friction, not cutting but rubbing the surface.

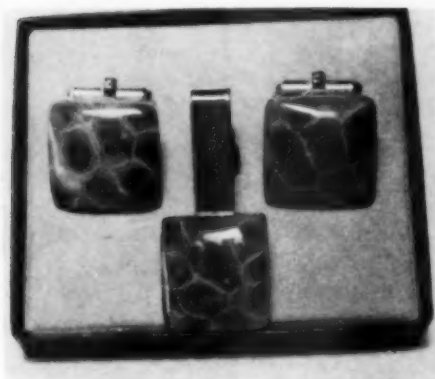
The actual polishing is done on a wooden 8" wheel, ¾" in thickness and covered with ½" layer of felt (carpet underlay or equivalent material). Over this put a thick cover of cotton velvet. Be sure this material is not a stain- or waterproof material. If so, it will not absorb the necessary moisture. Watch this carefully as today the manufacturers, for the sake of the housewife, use materials that can be cleaned readily or else substitute dacron or some other synthetic material that will not be acceptable for this work. If you can find the back of an old sofa, this seems ideal.

I've tried all the various polishing agents. The best for this purpose is just plain tin oxide mixed to a creamy consistency and applied to the velvet to the extent that one can still see the color of the velvet through the white

mixture. Run the wheel at 360 RPM (1¼" pulley on motor shaft and 6" pulley on arbor) and start about half way in from the outer edge. Again, to avoid heat, use approximately 2 to 3 pounds of pressure and take your time. I use two wheels. The first is usually quite damp and gives an excellent polish. However, to really get a glassy clear finish, I follow this up by touching very lightly on a dry wheel on which this mixture has already set up. I apply only enough moisture to make it stick to the cloth. John Willhammer suggests merely moving the stone closer to the shaft on the same wheel but where possible I believe a second wheel is best and will not be as wet. To do a cuff link takes me from 3 to 5 min.

I might add that though I have special jade wheels of leather, hard felt for agates, canvas for softer stones, and several other varieties of polishing wheels, besides all the compounds, I can get just as glossy a finish on almost any stone by using the velvet wheel as by using those with a harder

(Concluded on Page 107)



Handsome cuff links and tie clasp. (Swiped by the photographer who took their picture.)



The high luster obtained on this symmetrical pendant is indicated by the prominent highlight.

So You Want to Start a Rock Shop?

by ARTHUR E. VICTOR

OPENING a Rock Shop may seem to be simply the process of "hanging out your shingle." Perhaps starting a business was that easily accomplished in the good old days. Now we have zoning laws, a variety of licenses, excise tax, B & O tax, property tax, income tax, and insurance for fire, theft and liability. Then, there is social security tax, labeling requirements, employee regulations, weights and measures inspections, to say nothing of parking problems and fire regulations.

The mortality rate of small business makes dismal reading. The statistics are all against success and the saddest statistical fact is that practically all business failures could have been prevented. Enthusiasm, optimism, energy, eagerness are all desirable and neces-

sary if tempered and controlled by factual realities. Apply a little of that rare and priceless ingredient of success, defined by the all-inclusive term of "common sense."

In a "thumb nail"-sized business the investment may be infinitesimal compared to that of the giant shopping center, but in proportion it is equally important. Failure can be a catastrophic family financial loss and a shock to one's ego, but success is surely a great and satisfying triumph.

What then are a few of these "common sense" things one must do to operate a successful rock shop?

First is surplus money—unencumbered money—cash; goods for sale; buildings; classed as "capital." One *MUST* have goods for sale, a place to



Our author takes much pride in his shop and well stocked sales room, where visitors are always very welcome.

sell them, and money for fuel, light, rent and family living. The amount may be large or small but there must be *some* money with which to start and enough in reserve to "live on" until the business grows. For several years every sales dollar will go back into the business to buy more goods. Net profit is quite different from gross profit. Remember, with a 15% net profit (and this is high) you must sell \$666 worth of merchandise to buy \$100 worth of new goods at wholesale. Note well that little word *net*. Most goods will be sold at more than 15% mark up. It sounds wonderful, but who pays all the insurance fees, the license fees, the taxes, the extra lights and fuel and telephone, postage, freight, office supplies? Who pays for labor, breakage, service, advertising, bookkeeping, loss by pilfering? Curb your enthusiasm and sharpen the pencil. Don't stretch that capital too far.

Next is customers. *Who* will they be and *how many*? What are their needs and *what will they buy*? In other words, a "Market Analysis." That big shopping center near you wasn't built because a parcel of vacant land was available. Many months of analyzing the market area convinced someone that buying customers would be available. The ideal situation would indicate the finding of an area of potential customers and setting the shop in the most accessible spot. Most of us, however, will find the shop location "fixed." Maybe our own home; or perhaps the only vacant building available. So if the location is already selected by necessity, then figure out, as best you can, the potential customers available to that location. If there are potential customers, how are you to induce them to trade with you? What are the goods and services you can provide? Will these goods and services be attractive enough to compete with other shops or the catalogues or will you fill a need not now supplied by anyone? The answers to these questions will determine the type and kind of services and goods necessary. A word of caution, don't plan on "cut rate" prices to attract customers. May-

be this will be a "spare time" operation with no cash out for labor; maybe you are operating in your own home and back yard; but those "overhead" costs are there regardless of whether or not you recognize them or ignore them. What are you going to do pricewise, if the business grows and "hired" labor and expansion become necessary?

Now what about *you*? Do you like to meet people? Can you readily think of something to say to a stranger that will start him talking? Do you "know" your rocks, or specimens, or jewelry, or machinery, or whatever it is you expect to sell? Do you know values so you can buy and sell intelligently? How about the other members of the family? Most little rockshops are a husband-and-wife operation. Are you both interested and willing to work?

So the "common sense" approach is to determine who your customers will be; what kind and type of merchandise they will need; to adjust the starting size of your stock to the capital (money) available. You decide you have the detailed technical knowledge needed. Now you are ready to check the zoning ordinances to determine what kind and size of signs to use and if a hobby business is permitted. Next come the various licenses required and the contacts with the excise tax people. You may find local, state and certainly federal excise (sales) taxes apply to your business.

Don't forget insurance. All your policies will need revision and you will need more—see your agent.

"What's in a name?" for the shop—make it short and easy to say and to remember. Consider how it will sound to a total stranger and how it looks in print. "Gertie's Garnet and Gravel" might produce a smile and be satisfactory with your local friends but so would "Jones Agate" and it certainly would inspire more confidence in a casual stranger. Choose a name to suit the operation. "The U.S. Agate Company" might be O.K. for a big chain of stores, but hardly suitable for a small community enterprise.

Keep accurate accounts. The vari-

ous tax collectors will force you to maintain costly and elaborate records. Use them to control your business; records will show changes needed before serious trouble develops.

Sell for cash and pay your bills when due. These "thumb nail"-sized owner-operated businesses invariably get into trouble with credit customers. Credit buying and installment purchases are standard practice for large impersonal operations but you have a personalized, friendly, first-name type of business. Are you physiologically and physically prepared to go over to your customer's house and drag lapidary equipment out of his basement when he gets behind on payments; or maybe you have capital (money) enough to carry him until his wife gets well or he gets a better job. It is far easier to tell your customer you have an understanding with the bank—they won't sell lapidary equipment if you don't loan money. Your customer will not be angry; he will come back when he has the cash and if he never has it, you wouldn't have had it anyway.

Know your costs! Don't guess. You make a purchase that requires a letter, stamps, time, and check cost, and you have that money invested until the goods are sold. Then it arrives; you pay the freight, unload, unpack, check, price it, and put it on the shelf—more cost. It is finally sold—more labor, wrapping paper, bookkeeping. And you have provided space, lights, heat, delivery costs, service. Maybe there is breakage, shopwear, pilferage; all are business costs. Repeating for emphasis! Know your costs; don't just "guess" you are making money.

Many of us have accumulated over the years a back yard full of stone and perhaps a sizeable supply of jewelry, specimens, and "Bragging Rocks." This material is capital when called merchandise for sale and we may erroneously consider a sale at any price virtually clear profit. Watch it! Don't price too low. Know your value so that stock can be profitably replaced at current wholesale prices.

Finally, one more item. Many pub-

lications are available to instruct and inform the small businessman. All will stress honesty in advertising and accurate records for the tax collector, usually with the additional admonition of the severe penalty involved. Very little is said about the more important common honesty in the little details of day-to-day contact with customers. The small community shop of any kind depends upon repeat customers; they return because of their confidence; not alone in price and quality, but in the advice, guidance, suggestions, and general information. Most of us have such poor memories it behoves us to stay close to the truth at all times.

Operating a small rock shop can be a most gratifying and profitable enterprise. There are a few "stinkers" but rockhounds are the friendliest, kindest people in all the world. A hobby is defined as an "activity of absorbing interest." No man, woman, or family can have an absorbing interest in the wonderful world of rocks and gems and not be bettered mentally and physically and happier because of it. As a Rock Shop, you can have the additional pleasure of helping others enjoy this happier and more productive life.

RECOMMENDED READINGS

"Scuba Diving for Coral in Florida," by Rev. Luke McMillian, March issue of *Central Michigan Rockhound News*. Rev. McMillian points out that combining scuba diving and rockhounding can be very rewarding. Coral is not the only treasure that has been found on the bottom of a lake or ocean; gold, the highest quality of jade, and even a meteorite have all been found under water.

"Aaron's Breastplate," by Dr. O. R. Shields, March issue of *Rock Lore*. A history of the Breastplate of Aaron and a beautiful and informative description of what is believed to be the only authentic replica in existence. This replica is valued at \$21,000 and was made by A. Paul Davis, Vice President of the St. Louis Gem and Mineral Society. The making of this unique treasure required four years of research and work and its premier showing will be at the National Art Gallery, Washington, D.C., during the month of June.

Rockhounds' Paradise—U.S.A.

By ROBERT MARKERT,

President, Midwest Federation of Mineralogical and Geological Societies

"GO WEST, YOUNG MAN, GO WEST." These were the words of Horace Greeley that fell on the ears of adventurous as well as industrious persons back in the early days of our forefathers. Little did William A. Burt and his party of surveyors realize that the deflection of the magnetic needle of his compass would lead to such things as the construction of the Soo Locks and the development of this vast unknown wilderness, a country serenely calm in natural beauty, with abundant waterfalls, streams teeming with brook and rainbow trout, swarming with beaver and otter, and terrain used only by bear, deer, fox, wildcat, coyote, and wolf.

Well-worn foot paths attested to trade routes of the Indians who long before had achieved useful employment for the outcrops of native copper found on Isle Royale in beautiful Lake Superior. I wonder if Burt could then have estimated the importance of his "find" or foreseen that some day it would provide a lure to the many hundreds of persons who see in those iron minerals an opportunity of obtaining items of unusual interest for their collections.

I wonder, too, how many of these collectors realize the many hardships encountered by the group of brave explorers that founded, and through later years, developed, the rich iron ore mines that now provide specimens of excellent quality and in great abundance for our display cabinets. These specimens may be collected with little or no trouble other than disturbing some of the waste on top of the rock piles, or perhaps suffering the hardships of driving a hard bargain in trading. When the 20th Annual Midwest Federation Convention convenes in Ishpeming on July 1st to 4th the appeal of adventure will be just as real to the 1,000 or so "prospectors"

that file past the registration desks in the National Ski Hall of Fame as it was to the pioneer prospectors of 100 years ago.

To some the prospecting will be for new friends or renewal of old friendships. To others it will mean adventures to be recorded by cameras of all descriptions. To others it will mean a camping trip with certain extras provided, and a chance to study minerals in their natural geologic environment. To still others, it will mean a guided trip to spoil piles that have been known to yield excellent specimens, with that flickering hope that an exceptional specimen lurks somewhere just below the surface of the pile, waiting to be picked up by a person who is ever on the alert.

As you collect at the Greenwood and Clarksburg furnaces, ponder a while upon the reason why such furnaces ceased to produce pig iron ingots. Up to the year 1855, when the Soo locks were first opened for traffic, local iron forges or furnaces consumed approximately 25,000 tons of ore. Was it because of the opening of the Soo Locks and the dictatorial powers of Cleveland and Pittsburgh financiers, or was it because of the remoteness of the source of charcoal fuel for the furnaces that the iron furnaces in the Upper Peninsula were closed down? Whatever the reason, the fact remains that such furnaces existed, as is evidenced by the many piles of varicolored slag nearby. Many pieces of this slag, produced in the 1850's, are now being cut into beautiful blue and green cabochons, while other pieces of grey slag find their way into fluorescent displays all over the country. Rummaging around on the piles, one may also find chunks of iron that are the direct products of iron ore taken out of the ground back in those good old days of hardy people.

Throughout Michigan's Iron Ranges many specimens of excellent botryoidal hematite and goethite have been found. Other hematites gathered for attractiveness and eye-appeal are specularite and micaceous iron ore. The National Mine piles have been the most prolific source of excellent goethite specimens, while specularite is found on the Champion and Greenwood mine dumps. Micaceous hematite is found on most dumps of the area, the most productive being the dumps located at Stoneville. Excellent specimens of high grade magnetite can also be picked up on most dumps of the area, the Champion mine, of course, yielding the best of this material.

REMINDER TO 1960 FIELDTRIP-PERS. Don't forget to include a magnet in your rock collecting kit when you head North in late June. The Gogebic Range has been the best known area from which needle-variety hematite comes. Many old-time miners brought up specimens from underground in their lunch buckets, that probably made the trip into the mine stuffed with a huge aromatic and perfectly delectable Cornish pasty. To those of you coming up here, remember to ask your field trip guide if there is a chance to get a pasty for lunch on one of those days you will be with us.

Iron-associated minerals of this area include manganite and barite. Again we refer you back through the pages of history, to say that the Lucy Mine of Negaunee was the location for the most unusual and beautiful crested barite on manganite that ever graced a collection. Since the Lucy Mine is no more, the best that we can do for you when you come up is to take you into the neighboring property of the South Jackson Pit where nice manganite specimens have been found.

Shortly before the turn of the century and the replacement of the first rotted board in Ishpeming wooden plank sidewalks, exciting cries of "gold" were heard round and about this mining camp. It seems that a druggist in Ishpeming had really hit pay dirt on one of his weekly excur-



Native Copper and iron mineral specimens will be found galore.

sions away from his drug store. Julius Ropes was to touch off county interest that momentarily distracted from the gold rush to Alaska, at least so far as the local people were concerned. The ridges, hills and outcrops of the Dead River Basin area north of Ishpeming were soon to resound to the metallic reverberations of sledge against drill and metal against rock. Many mining explorations followed quartz dikes and veins until they diminished into the granite bowels of the earth. One wonders just what motivated these hardy souls as they drilled, sledged, picked, sweated, and blasted their way 400-500 feet into the sides of sheer cliffs. Many of these enterprises that were backed by pretty gilt-edged securities probably lost their forward momentum when either the quartz seams or the buyers of those gilt-edged securities gave out.

The Ropes Mine was a different story, however, accounting after three years of mining in the 1890's for over \$650,000 worth of recovered gold. How much wasn't accounted for will never be known, although it is a known fact that much of the ore was high-graded before reaching the stockpiles. IS THERE YET ANY GOLD ON THE OLD STOCKPILES AT THE ROPES? An interesting question. The answer: we don't know. We plan on

guiding you to the mine and hope that you will have occasion to be just as elated as Julius Ropes must have been on that eventful day in the 1800's when his hobby paid off handsomely.

We do want to impress upon you that when you join the field trips in this 20th Century July, you too will be prospecting. Will you find anything? We hope that you do, for we have met with good success from year to year, but only with lots of hard work, plenty of luck, and a pair of observing eyes. Can we guarantee that you will find certain minerals? Certainly we cannot. We can only say that our country has yielded such minerals as these and hope that you too will enjoy good hunting and collecting. With good luck you possibly may find goethite, botryoidal hematite, blue steel ore, jaspilite, barite, quartz xls, quartz, manganite xls, hausmannite xls, rhodocrosite xls, magnetite and xls, martite xls, bornite, chrome nontronite, saponite, calcite, specularite, micaceous hematite, siderite, pyrite, tourmaline, talc xls, agate, epidote, sericite, aphrosiderite, garnets, grunerite, pyrolusite, drusy quartz, mica, staurolites, sammet blende goethite, amethyst, ilmenite, dolomite, feldspar, and others.

WE WOULD HEARTILY ADVISE YOU TO SUBSCRIBE TO ONE OF THE TRIPS TO THE OUTLYING DISTRICTS ON AT LEAST ONE OF THE DAYS. EACH OF THESE TRIPS IS DESIGNED TO INCLUDE THE BEST OF COLLECTING. They are to Stambaugh-Iron River, Michigan; to the Ironwood-Hurley area (to be handled by the Range Rock & Mineral Club of Ironwood); and to the Copper Country (to be supervised by Professor K. Spiroff of Michigan College of Mining and Technology).

REMEMBER the only guarantee that we'll make is that we'll see that you collect on dumps that have been known to yield such specimens as listed above. The rest will be up to you and Lady Luck. Sharpen your picks and chisels, check your gear, fill up the old jalopy, aim it North, and let her rip. We'll be waiting for you July 1st.

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In The Yellowstone Earthquake

By RICHARD M. PEARL

THE interpretation of earthquakes has given us most of our knowledge about the interior of the earth. I feel fortunate as a geologist to have experienced a famous quake and should like to tell my impressions of it. On the night of August 17, 1959 my wife and I were staying in the town of West Yellowstone, Montana, on the west border of the park.

Although popularly known as the Yellowstone earthquake because the name of the park is so familiar, the official name is the Hebgen Lake earthquake. The center of the first and strongest shock has been placed at the latitude of 44 degrees and 50 minutes north, and the longitude of 111 degrees and 5 minutes west, as determined by the U. S. Coast and Geodetic Survey. This site is about 12 miles directly north of West Yellowstone and it is in Montana, less than a mile inside the west boundary of Yellowstone National Park. The later shocks originated at somewhat different locations in the general area.

The day before the quake we drove north from Jackson, Wyoming and stopped for a view of the famous Gros Ventre landslide of 1925, which later

resulted in a disastrous flood downstream at Kelly. We had examined this spot in detail several years before. We were on our way to Frank, Alberta, which was the place where in 1903 the entire face of Turtle Mountain broke loose and devastated the coal-mining town, with a loss of 70 lives. However, we did not get to Frank because the earthquake changed our travel plans by destroying the roads we were to have taken the following morning.

We stayed Sunday night at the new Canyon Village. After having lunch on Monday with the family of my colleague, Dr. William A. Fischer, a park naturalist stationed this year at Canyon, we drove out the west exit. Renting a log cabin where we had stayed once before in West Yellowstone, we went to sleep about 9:30.

The first quake was recorded by the Seismograph Laboratory at Pasadena, California, as beginning 15 seconds after 11:37 P.M., Mountain Standard Time. Sometime before 11:38 arrived we were standing outside under a full moon watching hundreds of tall pine trees waving weirdly without any wind stir-



Havoc wrought by Yellowstone Earthquake shown here is typical of places elsewhere in area.

ring. We might have gotten out a bit earlier except that the cabin door was jammed and it took some effort to pry it open against the crazy yanking movements of the quake. My wife tried to put on her slippers but the shaking of the bed kept knocking her head against the log wall. Meanwhile the ominous rushing noise, apparently of the landslide to the north, was overwhelming.

Ours was the only cabin of about twenty in the group that did not lose its brick chimney; and the rest of our damage was trivial—a broken glass and spilled soap dish in the bathroom, and everything spilled from a purse onto the floor. But elsewhere the wreckage was extensive, and the valuable personal possessions of china and glass that were destroyed impressed me, though not thought worth mentioning in the news reports, which were concerned with the really tragic events near Hebgen Lake. A cabin near us had its icebox thrown off the porch. Our proprietors occupied a home that seemed an utter shambles inside, one of many like that. Across the street was a new paint and varnish store, in which nearly every can and bottle landed on the floor, and many broke into a sticky mess. Other merchants had similar troubles, and after they had straightened things out, the next quake only restored the chaos.

It was curious to note that the buildings in town made of logs yielded to the shock, with a substantial amount of broken window glass being the chief construction loss, whereas the rigid modern buildings were apt to be torn apart. Breakage was concentrated among objects in the line of motion of the earthquake waves, and their direction could be readily determined.

After some minutes of animated conversation, our California neighbors went back to sleep, much to our amazement, though some of the accommodations could scarcely have been comfortable. (The next night, however, we did the same thing, sleeping through at least one hun-

dred fresh shocks, awakening only for the worst ones and nodding knowingly at those. This time we occupied a different cabin down the block because it seemed more firmly built.)

The fire truck clanged to one call after another during the interval after the initial quake, but we learned of no actual fires. The total lighting was off for only a short time; but individual residents turned the gas and water off as they thought best. The sheriff's car and siren were busy all night. The telephone exchange was badly damaged so that no long-distance service was available for some while. The next day we sent a telegram of assurance from the Union Pacific office, and several days later we phoned to our families from central Idaho. I was surprised to see some of the gruesome telegrams sent by people who were no worse off than we, evidently delighting in adding to the worry of their relatives.

All night long people gathered in groups around bonfires in vacant lots, sitting on logs or chairs, and became well acquainted. A few drunks were, in fact, too friendly. The night was chilly enough, but I thought rather mild for West Yellowstone. Several young men from the long two-story hotel across the street from our bonfire kept it going through the slow hours; one from Cornell University, whose name I did not find out, will be a community leader someday, for he knows how to do things properly in an emergency. At about 4 o'clock — following three heavy aftershocks at 12:56, 1:42, and 4:04—a dismal rain began, so we returned to our cabin but could not rest.

Meanwhile I had been trying to learn something from my first earthquake experience. One newspaper reporter wrote that many people acted badly frightened throughout the night but I failed to see the slightest sign of it. Only one person in town was injured, and the radio reports were too vague to be taken very seriously, though they were indeed excit-

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ing. One girl, for example, heard that her home city of Idaho Falls was in ruins.

I listened at times to the sheriff's radio and to others as I wandered around town, endeavoring to piece the story together. A powerful earthquake earlier that day in the South Pacific was reported and the impression given that ours was part of a world-wide catastrophe. Inasmuch as nobody yet knows how one quake can affect another, it is not impossible that the Pacific one could have triggered the one at Yellowstone. The Hebgen Lake earthquake itself was actually felt over an area of about 550,000 square miles, extending from Utah and Nevada to British Columbia and from the Pacific coast to western North Dakota.

When another mighty jar came at 8:26 A.M. we got up and drove out to the airport to see if we could help with any relief work. The rescue was well in hand, however, and the Air Force and Forest Service did an especially notable job in removing survivors from the Rock Creek campground on the Madison River, 6 miles below the Montana Power Company's Hebgen Dam. The seriously injured were evacuated to Bozeman after being brought to West Yellowstone for temporary treatment. The field was occupied by a variety of aircraft, including two helicopters and an Air Force rescue plane, which came and went for many weary trips. A temporary hospital and soup kitchen had been set up in the hangar. Some people in their night clothes looked as cheerful as their fatigue or injuries would allow. Others, awaiting news of their lost families, were a pitiful sight.

The road to Pocatello remained open, and travelers streamed out Tuesday morning. Some made their way to Yellowstone Park by way of Jackson, to replace those coming out of the park as fast as they could. Admittances were off considerably the rest of the season—understandably

so, for many features were inaccessible, roads blocked, and rooms out of use. The quakes still continue.

Finally the restaurants in West Yellowstone closed and we were obliged to leave, perhaps the last visitors to do so. We could observe numerous evidences of broken roads and concrete bridges and twisted markers. Instead of Vancouver and the Portland convention of the American Federation of Mineralogical Societies, most of our trip was spent in northern California.

(Continued from Page 97)

surface. I have tried combinations of oxalic acid and tin oxide but still believe just tin oxide is the best. No polishing job will ever be better than the sanding prior to polishing. Sanding and holding heat to a minimum are the two essentials to obtaining a beautiful stone on completion of one's work.

We in Michigan have very few semi-precious stones but our Petoskey is outstanding. We are fortunate in that it is unique. Each Petoskey was a living organism at one time, a colony of polyps. Each tiny hexagon in the stone was an individual polyp. No two stones are identical and they cannot be matched as can almost any other rock. Even the width of the saw blade will change the diameter of the eyes slightly in the majority of cases.

In conclusion, the Petoskey does not possess the color of the tiger-eye nor the brilliance of the diamond, but for pattern, warmth, and loveliness, combined with interesting background, it is unsurpassed for the making of fine jewelry.

SPECIAL ANNOUNCEMENT !!

WE are indeed fortunate to be able to announce that beginning with our August issue a continuing series of articles will start on "THE ART OF FASHIONING GEM STONES" by our own J. Daniel Willems, an expert in his own right, upon this very fascinating subject. You will not wish to miss a single one of these fine articles.

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Petrified Forest National Monument



"Large Logs"—typical scene from the Petrified Forest National Park of Arizona.

AT LAST! A NATIONAL PARK:—Many millions of years ago, hundreds, perhaps thousands of trees from a great primeval forest were floated down a mighty river, perhaps into a large lake or embayment, where they eventually became water-logged and sank to the bottom, afterwards to become buried in deep sands and other sediments.

In the course of time the lake disappeared, and as the overlying alkaline ground waters, capable of desolving silica, percolated down through their sandy graves it carried away their woody struc-

ture, atom by atom, and molecule by molecule, replacing each particle so removed with one of silica,—a form of quartz. Thus they were slowly turned to stone, becoming petrified,—our petrified forests of today.

As early settlers from the east pressed westward, about the middle of the last century, an Army Lieutenant on reconnaissance, riding about twenty miles west of the present city of Holbrook, Arizona, upon his return reported to his somewhat skeptical superiors that he had seen many "trees of stone."

Practically everyone now, even school children, has heard of the "great petrified forests of Arizona," and indeed there are today few rockhound collections in the country that do not display a specimen or two of "petrified wood."

While it is now forbidden by law, under penalty, to remove even the smallest fragment of petrified wood from the forest preserve, there are yet many areas skirting the park where good pieces may occasionally be picked up, or perhaps be obtained by purchase from roadside stands along the highways nearby.

After many years, this area which has previously been designated at the "Petrified Forest National Monument," is to become a great National Park,—in fact some 108 years after its first discovery by the Army Lieutenant riding horseback, it is said to be the country's 30th such park.

This new Petrified Forest National Park, as the 148 square miles will be known, is a group of sun-baked temptations to the most casual of rockhounds under constant invitation to look but not take.

Indeed, the politely worded admonitions to leave things as they are come so repeatedly that a timid visitor can become uneasy simply by stooping over.

Two U.S. highways and the Atchison, Topeka & Santa Fe Railway bisect the monument. Motorists can see most of the sights by taking the park road that runs between Highways 66 and 260. Only one part of the monument is visible without paying a small car admittance fee.

No untagged wood is supposed to be taken into Painted Desert near Highway 66, a kaleidoscope of tinted, eroded bentonite if the weather is right.

Rangers who collect the admittance fees at park road entrances also ask motorists if they are carrying any petrified wood. If they are, the wood is sealed and tagged for the time they are in the monument.

Philip F. Van Cleave, the monument's chief naturalist said the number of park

visitors has increased about 10 per cent each year since World War II, now reaching more than half a million annually.

What is new in an area which counts history in terms of millions of years?

For one thing, Van Cleave said, several new types of specimens have been found by probing into the eroded countryside. It will be a year before a laboratory study shows what they are.

Also coming up are construction of a visitor center near the Highway 66 entrance, increased parking areas, some road widening, a pure water supply and erection of about 20 employe houses.

You step out of a car at the monument museum near Highway 260, and walk through the museum into the Rainbow Forest behind it. The trees there are 160 million years old.

The base of one of the trees, Old Faithful Log, is nine feet thick. A gravel path leads through an area strewn with mineralized logs, many of them shattered by earthquakes and reduced to mere fragments by ages of natural forces.

Altogether, there are six separate "forests" within the monument. All are pretty much the same. The most remote is almost inaccessible in the Painted Desert.

Despite occasional reports of petrified wood smuggling, Van Cleave says the actual number of thefts is very small, due in part to conservation education in public schools.

If a visitor is caught trying to leave with a piece of wood, there is a law to take care of him. However, Van Cleave says, the most common action is a quick escort to the nearest monument exit.

Every rockhound who is not already done so should make an effort to see this great wonder of nature.

RECOMMENDED READINGS

"Gem Materials of Organic Origin," by Nan Priggie, April issue of *M.G.A.* The four organic gem materials: amber, jet, coral and pearl are discussed in detail and interesting facts about their origins and properties are given.

Book Reviews

CRYSTAL AND MINERAL COLLECTING. William B. Sanborn. A Sunset Book. Lane Book Co., Menlo Park, Calif. 1960. 145 pp. \$3.50.

This is a practical, down-to-earth book, telling the how, what, and where of mineral and crystal collecting and exhibiting. The author encourages the collector to classify and display his collection, rather than store it away in his basement. Photographs of outstanding mineral displays by many individuals as well as those of the Smithsonian Institute, the California Academy of Science, and the American Museum of Natural History are shown.

Emphasis is on identification, collection, classification, and display, rather than on chemical and physical analyses of minerals. The black-and-white photographs of individual specimens are helpful in identification. The directions for cataloging and labeling are also very helpful.

The book is not indexed but contains a bibliography. A few errors, such as transposition of a photograph and reference to "Moh's" instead of "Mohs'" scale of hardness detract from the general excellence, but we recommend it highly to rockhounds who would like to elevate their hobby to an art.

STRUCTURAL METHODS FOR THE EXPLORATION GEOLOGIST. Peter G. Badgley, Colorado School of Mines, Exploration Consultant for Tidewater Oil Co. Harper & Brothers (Geoscience Series). 1959. 280 pp. \$7.50.

This book is designed to give a comprehensive coverage of structural geology methods and to demonstrate their application in exploration. It comprises work initially carried out to meet the laboratory requirements of undergraduates at the Colorado School of Mines, but was expanded to include data which should be of value to the professional geologist.

The book's chapters are more or less independent of each other, each having been drawn largely from the author's own experiences in exploration. Examples are "Isometric Projections and Ore Reserve Estimations" and "Tectonic Analysis of Mining and Petroleum Districts as an Exploration Tool."

Forty-one problems in contouring and determination of relations are presented, many based on actual case histories. Numerous illustrations and air photographs assist the geologist in interpretation of data.

GEMCRAFT: How to Cut and Polish Gemstones, by Leland Quick and Hugh Leiper, F.G.A.; 182 pages, 177 illustrations (plus two color plates on the jacket), 7¼ by 10½ inches. Published by Chilton Company, Philadelphia, 1959. Price, \$7.50.

Here is a new book attractively printed and bound, with a striking dust jacket, and an original title that sets the tone for good reading; not for reading alone but for instruction and study as well. There is no hint of duplication or imitation of any other work, either current or old. It is individualistic and will stand up with the best of them. It is a book by worthy craftsmen, such as these authors are. The diction is vigorous and the points made are lucid. It is a pleasure to read.

The coverage of the subject is wide, and the treatment is largely instructional, with, however, ample reference areas. This makes a place for it in every gem library, for amateur, professional, student and teacher alike. There is not much missing, it is just about all there.

There appears here and there an occasional startling pronouncement, such as, for instance, that the standard mechanical faceting head is modern, when actually in 1604 a mechanical device was used which looks for all the world like the grandfather of all the so-called "modern" heads. And it was not new even way back then. The so-called free hand method came much later, making possible much greater speed in cutting.

The value and the wealth of the information is seriously hampered by the deplorable lack of an adequate index, which is a must in any reference work. The situation is somewhat compensated for by a rather detailed table of contents, which is at best only a substitute.

GEMCRAFT can be recommended as a well written, easily readable, fully understood and highly informative text that all serious gem lovers should have in their libraries, for it contains much material not published before. J.D.W.

INDUSTRIAL MINERALS AND ROCKS. Third Edition. Published by American Institute of Mining, Metallurgical, and Petroleum Engineers. The Maple Press, York, Pa. 1960. 934 pp. \$12.00. (Seeley W. Mudd Series)

For most of us this volume serves the purpose of an encyclopedia of industrial minerals and rocks. The book contains 55 chapters, each written by an expert in his field. Subjects covered include Abrasives, Cement Materials, Gem Stones and Allied Materials, Mineral Pigments, Nitrogen Compounds, Quartz Crystals and Optical Calcite, Vermiculite, and others. Texts were edited by a board of outstanding scientists headed by Joseph L. Gillson, editor-in-chief.

This third edition includes the many developments which have occurred in the technology and uses of industrial minerals during the 10 years which have elapsed since the second edition was published.

ELEMENTS OF CARTOGRAPHY. Second Edition. Arthur H. Robinson, Professor of Geography, University of Wisconsin. John Wiley & Sons, Inc., 1960, 343 pp. \$8.75.

Cartography is the science and art of expressing geographically, by means of maps and charts, the visible physical features of the earth's surface.

The second edition of this book emphasizes the designing and construction of the map as a medium for communication or research. More than 70 new illustrations and considerable re-writing have gone into this new edition. Small-scale cartography is stressed due to the persistent growth of population pressures and the strengthening of regional ties throughout the world. These have magnified the need for both the smaller-scale and the topographic maps.

Two recent major developments in cartography which are discussed in detail are: (1) the rapid growth of techniques for gathering and processing of aerial data, and (2) the marked advance in the technology concerning the preparation of material for reproduction.

The appendix contains a table of 5-place logarithms; squares, cubes, and roots; linear magnification for viewing maps on screens from stated distances; and proof of Tissot's law of deformation. An extensive bibliography concludes this practical and valuable book on a science of increasing interest in today's world of shrinking boundaries.

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(Continued from Page 89)

FIRELANDS GEOLOGICAL SOCIETY on March 7 heard Thomas Schopf, senior geology student at Oberlin College, speak on "Invertebrate Fossils and their Influence on Invertebrate Ecology."

The motto of the society's new work shop is "Where we will learn to do—not just listen."

MARQUETTE GEOLOGIST ASSOCIATION on March 5 was given a demonstration - lecture on "Photographing Choice Mineral Specimens," by Lester Weis of Kalamazoo, Mich. Mr. Weis also showed slides and movies of his latest Western trip.

PIASA ROCKHOUND CLUB at its February meeting heard Mr. and Mrs. Ted Boente, of the St. Louis Gem & Mineral Society, speak on "Crystals and Their Formation."

The club is named for the Piasa Bird, a legendary bird of the Illini Indians who once hunted buffalo and other game where the club's members now hunt for rocks and Indian relics.

MADISON GEOLOGICAL SOCIETY on March 21 was presented a talk on "Southwest Oregon," by Dr. Robert H. Dott of the University of Wisconsin. Dr. Dott is presently conducting geologic research on the Pacific Coast.

ROCHESTER EARTH SCIENCE SOCIETY recently heard a talk on "Precious Gems," by Mrs. Ralph Stevens of Bickel's Jewelers. To illustrate her talk, Mrs. Stevens displayed sapphires from the Bitterroot Mountain range in Montana, garnets from Idaho, black and white opals from Australia, jelly opals from Mexico, and a diamond in Kimberlite matrix. The most admired gem in the collection was a black opal, with a harlequin fire pattern, valued at over \$2000.

CHICAGO LAPIDARY CLUB'S program at its April meeting was presented by two of its members. Al Upson spoke on "The Hand Sanding Method," and Tom Priest chose as his subject "Working with Jade." Both speakers were well acquainted with their topic and passed on many good tips on how to obtain better results in lapidary work.

Two excellent how-to-do-it articles are featured in the April issue of the club's bulletin, "The Template." They are: "Cut Spheres in your Kitchen," by Al Upson and "A new Easy Method of Making Solderless Jewelry," by Doris Kemp. The first article tells how to adapt a mixing machine to cut spheres and the second deals with V-lock mountings.

BERWYN JUNIORS, a junior division of the Earth Science Club of Northern Illinois, has completed a mineralogy map of Illinois and is now working on a mineralogy map of the United States. Mineral localities on the map are indicated with actual mineral specimens of the area. When samples of a mineral are not available, the locality is marked and will be filled in as soon as a specimen from that area is obtained.

MICHIGAN GEM AND MINERAL SOCIETY reports that Phillip Loomis, age 9, one of its junior members, found a shark's tooth near Grand Rapids, Michigan that is 5 inches long, 3 3/4 inches wide and 1 1/3 inches thick and is in such an excellent state of preservation that it still retains its saw teeth edge. The Michigan State Museum identified it as a tooth from a fish called *Dinichyys* (the name means terrible fish) that lived in the Devonian seas 285-270 million years ago, and said that it is the largest tooth of this type seen by the Museum.

Other Societies

CONNECTICUT VALLEY MINERAL CLUB on April 6 heard Prof. H. T. Smith of the University of Massachusetts, speak on "Sand Dunes." Prof. Smith is the author of a book on "Aerial Mapping" and has made a special study of sand dunes, their origin and forms. Pictures of the recent earthquake in Montana were also shown by Professor Smith.

RAWLINS ROCKHOUND MINERAL AND GEM CLUB was shown slides of the high lands of Africa at its February meeting, by John Nieland. The pictures reminded the society of its native Wyoming and surprised many of its members who thought that Africa was a combination of dry deserts and humid jungles.

GEM CUTTERS GUILD OF BALTIMORE marked the end of winter with a field trip to an abandoned lead mine in Frederick County where its members collected galena and a red and white material that makes excellent cabochons.

COMPTON GEM AND MINERAL SOCIETY on February 20-22 made a three-day camping trip to the Coyote Wells district to collect mineral and fossil specimens. At nearby Pinto Mountain they gathered petrified wood, wonderstone and calcite. Along the highways they found rhodonite and garnets. In Fossil Gorge the group collected oyster shells and other invertebrate fossils which are found in a reef that was formed when an ancient sea covered this desert area.

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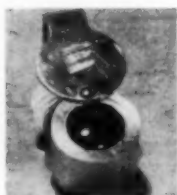
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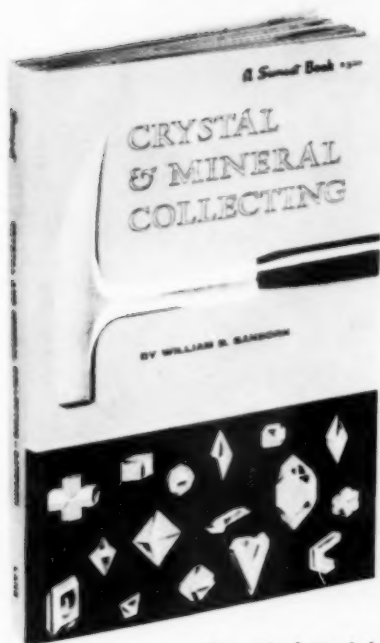
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